Alcatel-Lucent 1850 TSS-5 Transport Service Switch

Alcatel·Lucent

Modular Aggregation and Transport Unit

The Alcatel-Lucent 1850 Transport Service Switch (TSS-5) is a carrier-grade aggregation and transport device for meeting the changing needs of multiservice access networks. This compact, modular optical transport switch is ideal for carrying circuits or Ethernet over Time Division Multiplexing (TDM) or packet networks. Supporting any mix of traffic, from all-circuit to all-packet, it is ideal for use where TDM and Ethernet services coexist.

The Alcatel-Lucent 1850 TSS Family

New bandwidth-hungry services, such as triple play and Ethernet virtual private networks (VPNs), are placing great demands on the existing transport infrastructure. To remain profitable, businesses and service providers are embracing these new revenue-generating services by moving from circuit-based transport, using TDM, to packet-based transport, using Ethernet.

The new-services introduction is probably the most critical factor to a service provider's success. The increasing demand for bandwidth for these new services is not reflected in comparable increases in revenue, presenting a significant business challenge. The Alcatel-Lucent 1850 TSS helps businesses maximize their profitability by transporting any service mix while keeping strict control of the costs.

The Alcatel-Lucent 1850 TSS is a family of multiservice packet-transport products supporting any mix of traffic, from all-circuit to all-packet. With these products, businesses and service providers can build highly flexible networks that transition from circuit to packet transport gradually, as packet capacity is required, but without disrupting existing traffic or paying for expensive overlay networks. The 1850 TSS family optimizes network efficiencies by aggregating native signals and allowing transport of both packets and circuits.

Flexible and efficient aggregation and transport, meeting the evolving needs of multiservice access networks.

1850 TSS-5: Where TDM and Ethernet Services Coexist

The 1850 TSS-5 is a compact, modular, optical transport switch with the functionality to carry TDM traffic from 1.544 Mb/s interface/2.048 Mb/s interface (T1/E1) to optical channel level 12 (OC-12), and packet traffic from 10 Mb to Gigabit Ethernet (GigE). It is recommended for use where TDM and Ethernet services coexist.

Less than 125 mm (5 in.) tall, the 1850 TSS-5's small footprint is designed to extend optical transport to the customer premises. It is ideal for mobility backhaul from the cell site and for fiber-to-the-business (FTTB) and end-user-access applications. The 1850 TSS-5 is environmentally hardened, making it suitable for mounting in outdoor cabinets or at cell towers.

Pseudo-wire support of circuit emulation services (CES) makes the 1850 TSS-5 ideal for cell-tower backhaul and the smooth transition from TDM to third-generation mobile system (3G) and fourth-generation mobile system (4G) networks. It has small form-factor pluggable (SFP) optics, allowing the optics to be purchased separately from the circuit packs and plugged in when additional interfaces are needed. This design lowers initial capital expenditures (CAPEX), making the 1850 TSS-5 capacity easily scalable.

Multifunctional

Even by today's competitive standards, the 1850 TSS-5 is distinctly versatile and multifunctional. Fast Ethernet (FE) traffic can be aggregated onto up to 4 GigE ports and these ports can be electrical or optical, depending on the available or desired infrastructure. The 1850 TSS-5 supports carrier Ethernet services such as point-to-point Ethernet line (E-line) and virtual Ethernet LAN (E-LAN) with robust, standards-based quality of service (QoS) and reliability.

The 1850 TSS-5 provides high-speed optical transport for OC-3 and OC-12 linear optical extensions, while unidirectional path switched ring/Subnetwork Connection Protection (UPSR/SNCP) switching can be used at the synchronous transport signal level 1 (STS-1), STS-3c and virtual tributary (VT) 1.5 levels. Further, only minimal provisioning is necessary for private-line Ethernet over synchronous optical network/synchronous digital hierarchy (SONET/SDH) links between two end-points, typically just SONET/SDH cross-connections. Standard SONET/SDH loopbacks are also supported, including terminal loopback, facility loopback and external optical loopback.

The 1850 TSS-5 has several cross-connect capabilities, offering network designers greater flexibility in directing traffic flow through systems to support a wide variety of customer applications using two-way cross-connections. Where a SONET/SDH ring is created, protection switching is done independently for each SONET/SDH path. UPSR/SNCP rings operate in an integrated, single-ended fashion, eliminating the need for complex, network-level coordination in the effort to restore traffic.

Management and Performance Monitoring

Where required, the 1850 TSS-5 comes with a craft interface terminal (CIT) that manages SONET/SDH operations though a standard RS-232 or LAN port. A full-featured graphical user interface (GUI) may be used or, if preferred, transaction language 1 (TL1). Performance monitoring is also provided and software upgrades can be downloaded by FTP without a truck roll.

Various other functionalities such as Address Resolution Protocol (ARP) and Internet Protocol (IP) tunneling are also supported. For example, Proxy ARP support on the Gateway Network Element (GNE) eliminates the need to create static routes for routing the IP packets from the access network to the embedded network. Alternatively, customers can choose the Simple Network Management Protocol (SNMP), if preferred.

Common Applications

- Wireless backhaul using Ethernet or SONET/SDH
- Enterprise access using Ethernet aggregation into GigE
- Enterprise access using digital signal level 1 (DS1)/E1 and GigE over SONET/SDH
- Ethernet extension within an existing building or campus
- Private line and private LAN services and LAN interconnect

Versatile Applications

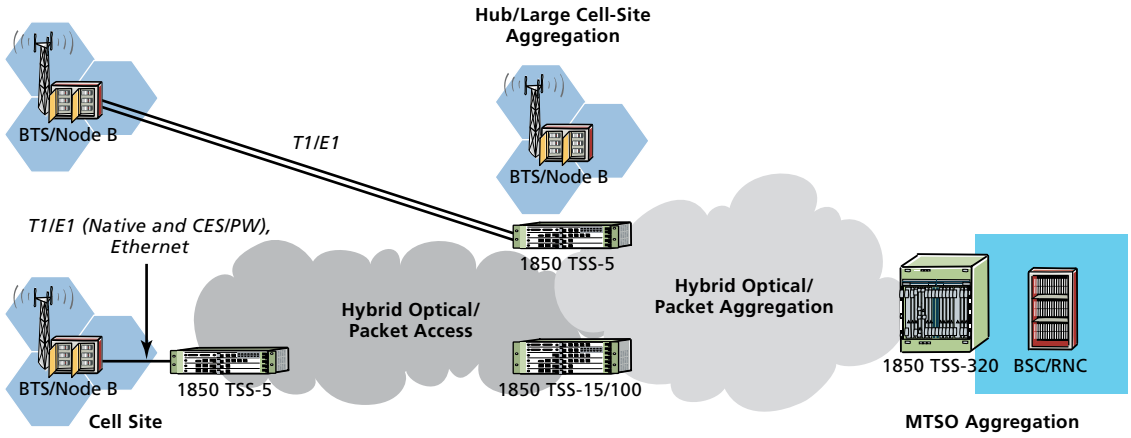
Mobility Backhaul

The 1850 TSS-5 supports backhaul for all wireless technologies, including:

- Code Division Multiple Access (CDMA)
- Global System for Mobile Communications/Universal Mobile Telecommunications System (GSM/UMTS)
- Wideband Code Division Multiple Access (W-CDMA)
- Worldwide Interoperability for Microwave Access (WiMAX)

Mobility second-generation mobile system (2G) and 3G traffic is accommodated using Ethernet or SONET/SDH transport. In addition, its aggregation capabilities allow the 1850 TSS-5 to backhaul multiple parallel networks simultaneously. With a SONET/SDH network, TDM traffic is carried in native mode and Ethernet is carried by industry-proven Ethernet over SONET/SDH (EoS). As mobility traffic and applications become increasingly data and IP oriented, Ethernet backhaul networks become more attractive. The 1850 TSS-5 offers feature-rich Ethernet services of up to GigE. (see Figure 1).

Figure 1. Mobile Backhaul



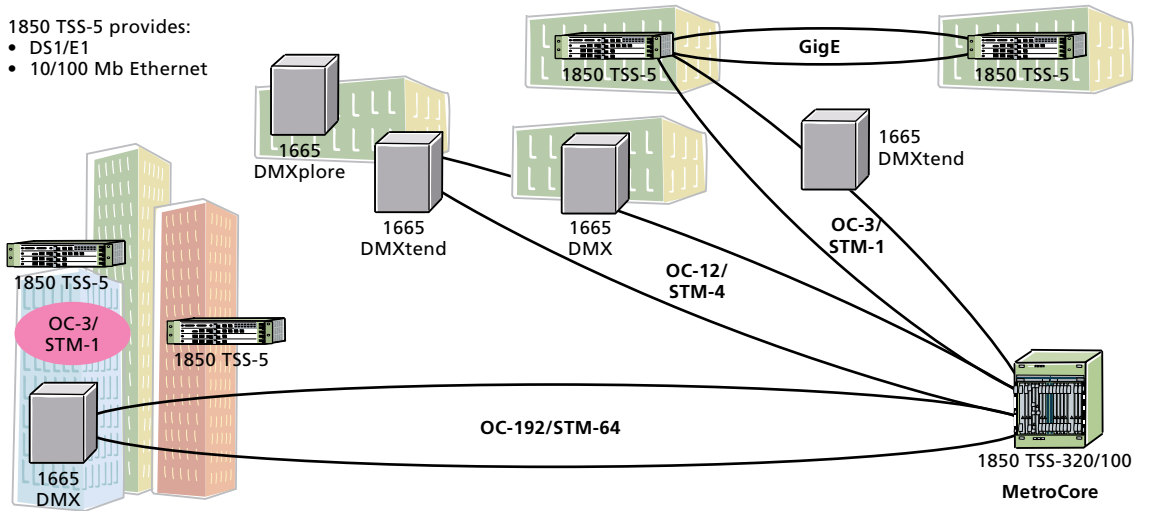
The 1850 TSS-5 supports graceful migration from TDM 2G services to fast-growing Ethernet- and data-oriented 3G services. With Ethernet backhaul, the 1850 TSS-5 supports TDM traffic by CES. In CES, TDM is transported over Ethernet by static multiprotocol label switching (MPLS) pseudo-wires protected by bidirectional forwarding detection (BFD), a form of label switched path (LSP) protection.

By using the 1850 TSS-5, businesses avoid making a premature SONET/SDH or Ethernet backhaul decision. They can start with SONET/SDH backhaul networks and move to Ethernet backhaul as packet traffic grows, transitioning from TDM backhaul to Ethernet backhaul on the same platform, where and when it makes sense.

Enterprise Services

The 1850 TSS-5 provides a low-cost solution for offering high-speed access to small and medium-sized enterprises. The 1850 TSS-5 provides businesses and service providers with reliable transport for both voice and data service. Figure 2 shows the 1850 TSS-5 placed in various buildings with diverse multitenant units. Separate users have distinct voice and data requirements, needing a mix of DS1/E1 and Ethernet connections.

Figure 2. Enterprise Access



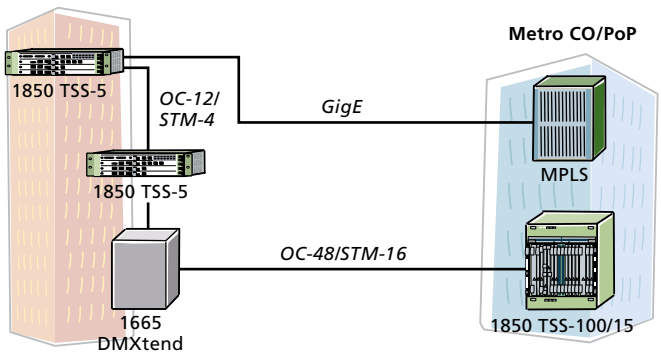
For enterprise services, the advantages of installing the 1850 TSS-5 include:

- Saves space, courtesy of the small footprint and avoiding the use of separate data switches
- Uses low-cost fiber terminations at the customer site
- Supports a variety of connection types and speeds, offering service flexibility
- Offers remote operations and monitoring from the central office (CO)
- Provides SONET/SDH-based protection for both voice and data

Figure 3 illustrates a low-cost solution for bringing high-speed access to small enterprise customers, using DS1/E1 and EoS-protected OC-3 or OC-12 lines, and aggregating Ethernet connections for transport over FE and GigE. The 1850 TSS-5 collects traffic from the multiple sources within the building, aggregates them together and then transmits the aggregated traffic by SONET/SDH or Ethernet to basement-located customer premises equipment (CPE) or even directly to the CO.

In this application, the 1850 TSS-5 again excels due to its small footprint and its support of both TDM and packet. Within the building it supports greater use of fiber, as opposed to copper, and enables EoS services such as virtual LAN (VLAN) and Ethernet private lines. In addition, the 1850 TSS-5 supports both electrical and optical Ethernet interfaces, greatly increasing network-design flexibility.

Figure 3. Ethernet Extension



Transition to the Future

The 1850 TSS-5 is a compact, feature-rich network element, small enough and with sufficient environmental hardening to operate in hostile environments such as cell sites, and in virtually any CPE situation. It is designed for the aggregation and transport of multiple types of traffic by the most cost-effective means possible, offering service providers and businesses an easy and affordable way to migrate from existing legacy architectures to service-enabled, packet-based architectures.

Recognized World Leader in Optical Networking

Alcatel-Lucent delivers end-to-end communications solutions to service providers and enterprises anywhere in the world. Leveraging its network equipment as well as services, Alcatel-Lucent facilitates its customers' service offerings and revenue streams. As the recognized world leader in optical networking, Alcatel-Lucent is in a unique position to help service providers navigate through current market conditions. Alcatel-Lucent, with its global reach and scale, combined with local presence in over 130 countries, makes use of a deep understanding of global-market dynamics, as well as the ability to anticipate local requirements.

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